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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,957	08/17/2001	Koichi Ui	900-398	2405
23117	7590	08/09/2005	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/930,957

Applicant(s)

UI ET AL.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12, 14 and 15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12, 14 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/553,148.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 15, May 11, and July 17, 2005 have been entered.

Specification

2. The disclosure is objected to because of the following informalities: The specification identifies the physical dimension for sheet resistance as " Ω/\square ". The " \square " dimension remains unrecognized.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 12, 14, and 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In claim 12, Applicant states "the silicon substrate heated to a predetermined temperature in a direction from a position immediately below the discharge port of the former dispersion head to a position

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immediately below discharge ports of the latter dispersion heads ". There is no support in the specification for applicant's functional heating of creating "a predetermined temperature in a direction..", i.e. a temperature gradient. Further Applicant's support for "heating means" is found in the specification in paragraph [0053]. Specifically, the specification teaches "any known methods can be used". "Any known methods" does not enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention to create "a predetermined temperature in a direction..".

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oda et al (USPat. 5,252,132) and Ellis (USPat. 5,487,784). Oda teaches Claim 12 - A production apparatus of a film, comprising: means for heating a substrate comprising silicon - Support for this portion of claim 12 is found in the specification in paragraph [0053]. Specifically, the specification teaches "any known methods can be used". Oda teaches a heater (12). As such, Oda teaches an equivalent apparatus that performs the function of heating a substrate (2). As a result, Oda's prior art element 12 for heating performs the identical function of heating the substrate in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183). Oda's heater (12) heats the substrate to a predetermined temperature (column 8; lines 1-15). Applicant's claim 12 requirement of "comprising silicon" is an intended use claim requirement. It is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531

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(CCPA 1959). "Apparatus claims cover what a device is, not what a device does ." (emphasis in original) *Hewlett - Packard Co . v. Bausch & Lomb Inc .*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Exparte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Oda further teaches means for positioning a bottom end of a discharge port of the first dispersion head ("former dispersion head") closer to a surface of the silicon substrate than is a bottom end of the second dispersion head ("latter dispersion head") - Support for this portion of claim 12 is found in paragraph [0076], [0098]. Specifically, the specification teaches "In FIG. 4, a distance A from bottom ends of the discharge ports for the gaseous titanium compound and the atmospheric gas to the surface of the silicon substrate 1 was set to 4 mm, for example, and a distance B from a bottom end of the discharge port for the dopant element compound to the surface of the silicon substrate 1 was set to 14 mm, for example. The difference between A and B was 10 mm.". Oda teaches that a distance from the bottom ends of any of the discharge ports (37a) of the dispersion heads (any of the plural nozzles 37) to a surface of the substrate (2) is variable and controllable (column 8, lines 17-28). As such, Oda teaches an equivalent apparatus that performs the function of providing a variable distance between Oda's dispersion head and Oda's substrate. As a result, Oda's prior art element of 37 for providing a variable distance between Oda's dispersion head and Oda's substrate perform the identical function of "means for

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positioning" in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Applicant's claim 14 requirement of "...said means for positioning and means for conveying cause a titanium oxide film to be formed in a non-uniform manner so that a concentration of the dopant element in the film varies through a thickness of the film so that the concentration of the dopant element in the titanium oxide film is higher adjacent a surface of the substrate than at a location spaced further away from the surface of the substrate" is a claim requirement of intended use. It is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ." (emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Exparte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). The Examiner believes that Oda's above detailed apparatus and means for film formation are capable of varying film thickness, to achieve uniformity, over the deposited substrate as discussed by Oda (column 8, lines 17-28). The Examiner believes it inherent that Oda's control means (column 8, lines 17-28) for uniform film deposition are capable of non-uniform film deposition.

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Oda does not teach conveyor means. Oda does not teach the distance/partitioned circumference from the bottom ends of his discharge ports to the surface of the substrate and the distance/partitioned circumference from the bottom end of the discharge port of another discharge port to the surface of the silicon substrate is 0.1 to 30 mm. Oda further does not teach the relative position between Oda's dispersion head and Oda's substrate surface where "the concentration of the dopant element in the produced titanium oxide film becomes higher from the surface of the titanium oxide film to the surface of the silicon substrate".

Oda further does not teach a partition (Applicant's 10; Figure 1) for surrounding a discharge gas between the latter dispersion head (any of the plural nozzles 37) and the silicon substrate, the partition being positioned below a circumference of bottom ends of the discharge port of the latter dispersion head (any of the plural nozzles 37).

Ellis teaches a continuous atmospheric pressure CVD device (Figure 1; column 5, line 60 – column 6, line 57) including conveyor means - Support for this claim limitation is found in lines 26-30, page 12 of Applicant's specification. Specifically, the specification teaches "...conveyor means is preferably constituted in such a fashion as to be capable of conveying the substrate from a position immediately below the discharge port of the discharge head for the dopant element compound through a position immediately below the discharge port of the dispersion head for the titanium compound in a gaseous state to the portion immediately below the discharge port for the atmospheric gas.". Ellis teaches conveyor means (6; Figure 1) capable of conveying the substrate from a position immediately below the discharge port (30; Figure 1) of a

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discharge head (20; Figure 1) through an adjacent position. As such, Ellis teaches an equivalent apparatus that performs the function of conveying the substrate. As a result, Ellis's prior art element 6 for conveying the substrate perform the identical function of conveying the substrate in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

Ellis teaches a continuous atmospheric pressure CVD device (Figure 1; column 5, line 60 – column 6, line 57) including a partition (28; Figure 1) provided between the dispersion heads (20; Figure 1) and the silicon substrate (4; Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Ellis's conveyor and partition to Oda's film deposition apparatus and for Oda to optimize the location and number of Oda's discharge ports relative to each other and to the substrate.

Motivation add Ellis's conveyor and partition to Oda's film deposition apparatus and for Oda to optimize the location and number of Oda's discharge ports relative to each other and to the substrate is to delimit film depositions as taught by Ellis (column 6; lines 9-13), and to provide for continuous throughput of Oda's semiconductor production as taught by Ellis (column 1; lines 40-59) respectively, further, motivation to optimize the location of Oda's discharge ports relative to each other and to the substrate is to control the concentration of reactant gases and to improve uniformity and thickness of the deposited film as taught by Oda (column 8, lines 17-28). Further, would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele, 406 F.2d

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1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc. v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). It is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

Response to Arguments

7. Applicant's arguments filed July 18, 2005 have been fully considered but they are not persuasive.

8. Applicant's traversal to the Examiner's objection to the specification based on unknown physical units of "sheet resistance" as " Ω/\square " is unpersuasive. Applicant's statement that "i" means square is confusing. No amendments to the specification have amended said units in said manner. The Examiner maintains his objection.

9. Applicant's clarification and amendment to claim 12 concerning the rejections based on 112, 1st paragraph, is helpful. However, the claim remains unclear as to the means for conveying. The Examiner suggests language such as "said means for conveying in a direction from a position immediately below.. ". The Examiner maintains his grounds of rejection until the claim is amended to clarify Applicant's claimed subject matter.

10. Applicant states that Ellis's partition (28; Figure 1) does not function as Applicant's claimed partition ("partition 10") because Applicant's claimed partition functions to discharge the process gas such that:

"the gas discharged from the head spreads out in the space partitioned by the partition 10 to reach the substrate. In other words, since the partition is in the form of a wall (square structure as

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shown from above with no top/bottom), the partition 10 prevents or reduces gas from passing through sides of the partition but does not prevent gas from passing through the top/bottom of the partition. This partition thereby allows for the effect described in Example 6 of the instant specification in certain example embodiments of this invention.

“ (page 7)

Based on Applicant's required function of Applicant's partition, the Examiner's prior and current assessment of Ellis is that Ellis's partition functions in an identical manner. Ellis's partition also is in the form of a wall (square structure as shown from above with no top/bottom) [See Ellis's 28, Figure 1 and gas flowing around the partition...]. Ellis's partition 28 also prevents or reduces gas from passing through sides of the partition (see vertical peripheries, and gas flows that are parallel to said peripheries at 30; Figure 1). Further, Ellis's partition 28 also does not prevent gas from passing through the top/bottom of the partition 28 as seen from porous conduit 30, Figure 1 of Ellis. Therefore when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

11. Applicant states:

“

Additionally, if 28 in Ellis is merely the head base, it cannot also be a partition provided between the dispersion heads and the silicon substrate.

“

This is contrary to the Examiner's prior citation where Ellis teaches “a partition (28; Figure 1) provided between the dispersion heads (20; Figure 1) and the silicon substrate (4; Figure 1)”. The

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Examiner does not cite Ellis as teaching an unclaimed "head base" or the claimed "dispersion heads":

12. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

13. Concerning Applicant's claim 14 traversal on page 8, the Examiner directs Applicant to the above stated position already set forth by the Examiner.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.


8/6/15